

Circulation in the Southeastern Mediterranean Sea (EGITTO-NICOP)

Pierre-Marie Poulain
Istituto Nazionale di Oceanografia e di Geofisica Sperimentale
Borgo Grotta Gigante, 42/c
34010 Sgonico (Trieste), Italy
Phone: +39 040 2140322 Fax: +39 040 2140266 Email: ppoulain@ogs.trieste.it

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http://poseidon.ogs.trieste.it/sire/drifter/egitto_main.html

LONG-TERM GOALS

To improve the understanding of marine environmental evolution, with particular emphasis on the eddy dynamics in marginal seas where the effect of bottom morphology, the forcing by sheared winds and fresh water inflow can be significant factors.

OBJECTIVES

The main objective of the EGITTO-NICOP project is to study the circulation in the Tunisian and Egyptian coastal waters. It is an extension of the EGITTO project to describe the surface circulation eddy and seasonal variability in the southeastern Mediterranean waters using low-cost satellite-tracked drifters in concert with satellite observations of sea surface temperature and near-surface chlorophyll pigment concentration.

APPROACH

With the help of Tunisian and Egyptian colleagues, drifters will be deployed in the southern flank of the Strait of Sicily and off the Egyptian coast. Some drifters might come ashore along the Tunisian and Egyptian coasts. The Tunisians and Egyptians will be asked to organize recovery operations. If in good working condition, the recovered drifters will be re-deployed more up-stream. All drifters will be Global Drifter Program (GDP) drifters drogued with a holey sock to 15-m depth, that is, the same drifters utilized in the EGITTO project.

The management of drifter data and satellite images will follow the one of the EGITTO project. In particular:

- The drifter data will be downloaded from the Service Argos server everyday. Near-real-time (NRT) data reduction and editing will be done and graphical summaries (spaghetti diagrams, time series, etc.) will be produced. Every three months, the drifter data will be processed (editing, interpolation, filtering) and will be archived in a database reachable interactively via internet. Maps of mean surface circulation and eddy variability will be produced for the different seasons.

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- NOAA AVHRR data will be downloaded with the OGS TeraScan receiving station. These satellite data are processed (navigation, calibration and registration) and SST images of the Eastern Mediterranean will be produced in near-real time.
- MODIS data will be downloaded from NASA's Goddard Distributed Active Archive Center (DAAC) in Greenbelt, Maryland and images of near-surface chlorophyll concentration will be created.

All of the above near-real time products are (will be) posted on a dedicated web page.

The data analyses will be done in collaboration with the Tunisian and Egyptian colleagues. The EGITTO and the EGITTO-NICOP drifter data will be combined to:

- compute Eulerian and Lagrangian surface circulation statistics. For example, mean circulation and eddy variability maps will be produced for each season. Similar maps will be created for different wind regimes using ECMWF products. Particular attention will be focused on the spatial structure and temporal variability of major eddies and strong circulations patterns. Lagrangian statistics, such as integral time and length scales and eddy diffusivities will be estimated.
- compare the drifter-inferred currents to SST/pigment structures obtained from satellite data. Images and animations with color-coded SST/Pigment fields overlaid with drifter tracks will be produced.

WORK COMPLETED

A total of 20 GDP SVP drifters were ordered and will be soon shipped to Italy, Tunisia and Egypt. Deployments in collaboration with the Tunisians in the Strait of Sicily are planned for early October 2006 and for December 2006 or January 2007. Deployments off the Egyptian coast are scheduled for October-November 2006 with the help of the Egyptian colleagues.

An EGYPT-EGITTO observational meeting will be organized at OGS (Trieste, Italy) on 9-10 October 2006 to discuss the first results of the EGYPT and EGITTO projects and to plan future measurements in the southeastern Mediterranean Sea. The Tunisian and Egyptian colleagues have been invited to participate in this meeting.

RESULTS

N/A

IMPACT/APPLICATION

The scientific impact of this project is to increase our understanding of the southeastern Mediterranean Sea dynamics and of its major forcing mechanisms. Future application could be the validation of diagnostic numerical models and the assimilation of the drifter data into prognostic numerical models in the framework of operational oceanography projects as part of MOON (Mediterranean Operational Oceanography Network).

RELATED PROJECTS

The EGITTO-NICOP project is strongly related to, and fully integrated in, several other projects sponsored by ONR, the European Commission and national funding agencies. These programs include:

- THE EGITTO project (http://poseidon.ogs.trieste.it/sire/drifter/egitto_main.html).
- The EGYPT program (<http://www.ifremer.fr/lobtln/EGYPT>), including drifter and profiling floats, hydrographic surveys, moorings, remote sensing.
- The National Tunisian Oceanographic Program, including drifters and hydrographic surveys.
- The MFSTEP (<http://www.bo.ingv.it/mfstep>) and MOON operational oceanography projects, including XBT transects, profiling floats, prognostic numerical models.